

### **REMARKS**

In the Office Action, claims 1-6, 8-12, 14-17, 20-26, and 28-31 were rejected. Claims 1, 2, 4, 5, 8, 10, 11, 16-18, 20-22, 24, and 25 were objected to. By this Response, Applicants have amended claims 2, 8, 10, 11, 16, 17, 20, 21, 22, 24, and 25 and cancelled claims 1, 4-7, and 18. Claims 1-31 remain pending in the present patent application. Reconsideration and allowance of all pending claims are requested in light of the above amendments and the following remarks.

### **Specification**

Applicants respectfully submit that paragraph [0018] has been amended to include a clarification regarding the usage of chemical formulae including parentheses. Paragraphs [0010], [0011], [0026], [0027], [0032], [0038], Table 1, [0040], and [0042] have been amended to include missing degree symbols.

### **Claim Objections**

Claim 1, 2, 4, 5, 8, 10, 16-18, 20-22, 24, and 25 was objected to as containing errors. Claims 1, 2, 8, 10, 11, 16, 17, 20-22, 24, and 25 have been amended to change the Markush phrase to "at least one". Claim 18 has been amended to include a missing verb "is". Claims 16 and 20 have been amended to include missing degree symbols. Claim 20 has been amended to include a missing word "and". Applicants thank the Examiner for pointing out these deficiencies.

### **Rejections Under 35 U.S.C. § 112**

Claims 14, 15, 29, 30, and 31 were rejected as being indefinite for failing to particularly point out and distinctly claim its subject matter. Claims 16 and 20 were rejected, as the specification was said to fail in enabling these claims.

The specification has been amended to clarify the meaning of chemical formulae used in the disclosure with parentheses including recited elements. As used in the

application, chemical formulae having two elements included within parentheses imply that at least one of the elements need to be present in the material. Applicants believe with the clarification inserted into the specification, the rejection of claim 14, 15, 29, 30, and 31 is obviated.

Claims 16 and 20 have been amended to incorporate "the phosphor comprises a material having a formula of  $(D_{1-x}Eu_x)A_3B_4O_{12}$ , where D is at least one of Y and a rare earth element excluding europium, and A is at least one of Al, Ga, Sc, and In," as suggested by the Examiner.

#### **Double patenting**

Claims 1-6, 8-12, 14, 15, 21-26, and 28-31 were rejected under doctrine of obviousness double patenting over copending application No. 10/317,423, and over copending application No. 10/317,424. Applicants understand that this is a provisional double patenting rejection and will consider filing a terminal disclaimer in the event that either copending Application No. 10/317,423 or Application No. 10/317,424 is allowed and issued prior to the allowance of the pending claims of the present patent application. Accordingly, Applicants request that the Examiner hold the provisional double patenting rejection in abeyance.

#### **Rejections Under 35 U.S.C. § 102(b)**

Claim 1 was rejected as being anticipated by E.P. 406,554 and U.S. Patent No. 4,512,912. Claims 1 and 16 were rejected as being anticipated by U.S. Patent No. 4,604,549. Claims 1, 16, and 21 were also rejected as being anticipated by J.P. 56-155282 or J.P. 56-155281. Claims 1-6, 16, 17, and 21-26 were rejected as being anticipated by J.P. 2000-290648. A *prima facie* case of anticipation under 35 U.S.C. § 102 requires a showing that each limitation of a claim is found in a single reference, practice or device. *In re Donohue*, 226 U.S.P.Q. 619, 621 (Fed. Cir. 1985).

Claim 1 is cancelled and hence the rejection of claim 1 is obviated.

Claim 2 has been amended to include the allowable subject matter from claim 7. The amended claim recites a phosphor composition including a material having a formula of  $(D_{1-x}Eu_x)A_3B_4O_{12}$ ; wherein D is a combination of yttrium and gadolinium; A is a combination of aluminum, scandium, and gallium. The cited references does not disclose or suggest a phosphor composition including a material having such a material makeup. Therefore, Applicants submit that amended claim 2 and its dependent claim 3 are in condition for allowance.

Amended claim 16 recites a method of making a phosphor, *the phosphor including a material having a formula of  $(D_{1-x}Eu_x)A_3B_4O_{12}$ , where D is at least one metal selected from the group consisting of yttrium and elements of the lanthanide series other than europium; A is at least one metal selected from the group consisting of aluminum, gallium, indium, and scandium, wherein the oxygen-containing compound of boron is  $H_3BO_3$ , and an amount of  $H_3BO_3$  in the mixture is in excess of stoichiometric amount.* As recognized by the Examiner, none of the cited references discloses, teaches, or suggests a method of making a phosphor by combining the oxygen-containing compound of  $H_3BO_3$  in an amount excess of stoichiometric amount. Therefore, claim 16 and its dependent claims 17 and 19 are believed to be patentable. Favorable reconsideration is requested.

Claim 21 has been amended to recite a light source including a *phosphor blend, wherein the phosphor blend includes: a phosphor having a formula of  $(D_{1-x}Eu_x)A_3B_4O_{12}$ ; wherein D is at least one metal selected from the group consisting of yttrium and elements of the lanthanide series other than europium; A is at least a metal selected from the group consisting of aluminum, gallium, indium, and scandium.* None of the cited references discloses, teaches, or suggests the claimed invention. On the contrary, all of the cited references disclose a phosphor of the kind,  $Gd_{1-x}Eu_xB_{1-y}(Al/Ga)_yO_3$ , which is a totally different class of phosphor. It is known that the absorption/emission

characteristics of a phosphor, as well as its temperature stability depend on its structure. The cited references do not disclose each and every element of the amended claim 21, particularly the provision of the recited blend. Therefore, Applicants submit that amended claim 21 and its dependent claims 22-26 are in condition for allowance.

**Rejections Under 35 U.S.C. § 102(e)**

Claim 1 was rejected as being anticipated by U.S. Patent No. 6,673,473 or U.S. Patent No. 6,517,741. Claims 1 and 16 were rejected as being anticipated by U.S. Patent No. 6,509,685. Claims 1, 21, 28, and 29 were also rejected as being anticipated by copending Application No. 10/37,424. Claims 1-6, 16, 17, and 21-26 were further rejected as being anticipated by Kyota Ueda et al., U.S. patent No. 6,676,853 (hereafter "Kyota Ueda"). A *prima facie* case of anticipation under 35 U.S.C. § 102 requires a showing that each limitation of a claim is found in a single reference, practice or device. *In re Donohue*, 226 U.S.P.Q. 619, 621 (Fed. Cir. 1985).

As noted above, amended claim 16 recites a method of making a phosphor, the phosphor including a material having a formula of  $(D_{1-x}Eu_x)A_3B_4O_{12}$ , where D is at least one metal selected from the group consisting of yttrium and elements of the lanthanide series other than europium; A is at least one metal selected from the group consisting of aluminum, gallium, indium, and scandium, wherein the oxygen-containing compound of boron is  $H_3BO_3$ , and an amount of  $H_3BO_3$  in the mixture is in excess of stoichiometric amount. Again, as recognized by the Examiner, none of the cited references disclose, teach, or suggest a method of making a phosphor by combining the oxygen-containing compound of  $H_3BO_3$ , and an amount of  $H_3BO_3$  in the mixture is in excess of stoichiometric amount. Therefore, claim 16 and its dependent claim 17 are believed to be patentable. Favorable reconsideration is requested.

As also noted above, amended claim 21 recites a light source including a *phosphor blend*, wherein the *phosphor blend* includes: a phosphor having a formula of  $(D_1$ .

$x\text{Eu}_x\text{A}_3\text{B}_4\text{O}_{12}$ ; wherein D is at least one metal selected from the group consisting of yttrium and elements of the lanthanide series other than europium; A is at least a metal selected from the group consisting of aluminum, gallium, indium, and scandium. Kyota Ueda does not disclose, teach, or suggest the claimed invention. On the contrary, the reference discloses a red emission phosphor. In fact, Kyota Ueda clearly discloses that the display includes phosphors emitting *blue, green, and red lights*. See, e.g., Kyota Ueda, column 1, lines 35 to 37. Moreover, examples 1-7 described in columns 6 and 7. The reference clearly teach use of red, blue, and green emitting phosphors to *obtain red, blue, and green lights*. There is no motivation or suggestion in Kyota Ueda to use a *phosphor blend to obtain white light*. Therefore, Applicants submit that amended claim 21 and its dependent claims 28 and 29 are in condition for allowance.

#### **Rejections Under 35 U.S.C. § 103**

Claim 16 was rejected under 35 U.S.C. § 103(a) as being unpatentable over E.P. 406554. Claims 2-5 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. patent No. 6,673,473 or U.S. patent No. 6,517,741. Claims 8-12 were rejected under 35 U.S.C. § 103(a) as being unpatentable over J.P. 2000-290648 or Kyota Ueda. For a *prima facie* case of obviousness, the Examiner must set forth the differences in the claim over the applied reference, set forth the proposed modifications of the reference, which would be necessary to arrive at the claimed subject matter, and explain why the proposed modification would be obvious.

As noted above, claim 2 has been amended to include the allowable subject matter from claim 7. Therefore, Applicants submit that amended claim 2 and its dependent claim 3 are in condition for allowance.

Claim 8 recites a *phosphor blend* comprising (a) a phosphor having a formula of  $(\text{D}_{1-x}\text{Eu}_x)\text{A}_3\text{B}_4\text{O}_{12}$ ; wherein D is at least one metal selected from the group consisting of yttrium and elements of the lanthanide series other than europium; A is at least a metal

selected from the group consisting of aluminum, gallium, indium, and scandium; and x is in a range from about 0.001 to about 0.3; (b) a green light-emitting phosphor; and (c) a blue light-emitting phosphor. Neither the cited Japanese reference nor Kyota Ueda discloses, teaches, or suggests the claimed phosphor blend. On the contrary, the references disclose a red emission phosphor. For example, as discussed above, Kyota Ueda clearly discloses that the display includes phosphors emitting blue, green, and red *lights*. There is no motivation/suggestion in Kyota Ueda to use a *phosphor blend to obtain white light*. Therefore, Applicants submit that amended claim 8 and its dependent claims 9-12 are in condition for allowance.

As noted above, amended claim 16 recites a method of making a phosphor, *the phosphor including a material having a formula of  $(D_{1-x}Eu_x)A_3B_4O_{12}$ , where D is at least one metal selected from the group consisting of yttrium and elements of the lanthanide series other than europium; A is at least one metal selected from the group consisting of aluminum, gallium, indium, and scandium, wherein the oxygen-containing compound of boron is  $H_3BO_3$ , and an amount of  $H_3BO_3$  in the mixture is in excess of stoichiometric amount*. As recognized by the Examiner, none of the cited references disclose, teach, or suggest a method of making a phosphor by combining the oxygen-containing compound of  $H_3BO_3$ , and an amount of  $H_3BO_3$  in the mixture is in excess of stoichiometric amount. Therefore, claim 16 and its dependent claim 17 are believed to be patentable. Favorable reconsideration is requested.

**Conclusion**

In view of the remarks and amendments set forth above, Applicants respectfully request allowance of the pending claims. If the Examiner believes that a telephonic interview will help speed this application toward issuance, the Examiner is invited to contact the undersigned at the telephone number listed below.

Respectfully submitted,

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